



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER OF PATENTS AND TRADEMARKS  
Washington, D.C. 20231  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/804,004	03/12/2001	Marcel Eduard Irene Broekaart	NL 000314	8862

7590

11/25/2002

U.S. Philips Corporation  
580 White Plains road  
Tarrytown, NY 10591

EXAMINER

HA, NATHAN W

ART UNIT

PAPER NUMBER

2814

DATE MAILED: 11/25/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

09/804,004

Applicant(s)

BROEKAART ET AL.

Examiner

Nathan W. Ha

Art Unit

2814

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 09 August 2002.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-11 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-11 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

## DETAILED ACTION

### *Claim Rejections - 35 USC § 112*

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claims 1-11 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. For instance, the phrase at the end of claim 1 states, "characterized in that a layer comprising silicon carbide is applied as the etch stop layer (12)." This phrase is ambiguous. Is **a layer comprising silicon carbide** the same as etch stop layer? Please address this matter in the next communication paper.

### *Claim Rejections - 35 USC § 103*

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 1-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Boeck et al. (5,880,018, previously cited) in view of Yew et al. (US 6,159,845, newly cited, hereinafter, Yew.).

In regard to claim 1, Boeck et al. show the method as claimed, in the Figures 14-15 with corresponding text, a method of manufacturing an electronic device, a

Art Unit: 2814

semiconductor device 50 in particular but not exclusively, which method comprises the steps of:

applying a semiconductor substrate which is provided with a conductor 54 at a surface, the conductor 54 having a top surface portion and sidewall portions, of which at least the top surface portion is provided with an etch stop layer 56,

applying a dielectric layer,

etching a via 68 in the dielectric layer (58, 62) over the conductor 54, and stopping on the etch stop layer 56 to create an exposed part of the etch stop layer 16, removing the exposed part of the etch stop layer 56 inside the via 68 from at least the top surface portion of the conductor 54,

filling the via 68 with a conductive material 66.

In accordance with the 112 rejections above, the Examiner assumes that the etch stop layer includes silicon carbide. Therefore, Boeck does not expressly disclose that the etch stop layer in his patent contain silicon carbide.

Yew, in fig. 1B, discloses an analogous semiconductor device including a substrate 100, an etch stop layer 106 made of silicon carbide in order to improve the device's performance since silicon carbide also provides hermetic and physical protection to the device after formation.

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention was made to substitute the silicon carbide material as taught by Yew in Boeck's in order to take the advantages as mentioned above.

In re claim 2, Boeck et al. disclose a method as claimed in claim 1, characterized in that the etch stop layer 56 is applied to the top surface portion and the sidewall portions of the conductor 54 after the provision of the conductor 54 at the surface of the semiconductor substrate.

5. In re claim 3, Boeck et al disclose a method as claimed in claim 2, characterized in that the via 68 is etched while overhanging at least one of the sidewall portions of the conductor 54 and exposing at least part of the etch stop layer 56, which etch stop layer 56 covers the top surface portion and the at least one of the sidewall portions of the conductor 54.

6. In re claim 4, Boeck et al. disclose a method as claimed in claim 3, characterized in that the etch stop layer 56 is removed from inside the via 68 from only the top surface portion of the conductor 54.

7. In re claim 5, Boeck et al. disclose a method as claimed in claim 2, characterized in that the etch stop layer 56 is applied to the top surface portion and the sidewall portions of the conductor 54 as well as to portions of the semiconductor substrate which are not covered by the conductor 54.

8. In re claim 6, Boeck et al. disclose a method as claimed in claim 1, characterized in that the conductor 54 is provided while comprised at least in part of a material selected from a group comprising aluminum, copper and tungsten.

9. In re claim 7, Boeck et al. disclose a method as claimed in claim 1, characterized in that the conductor 54 is provided comprising a capping layer 66, which capping layer 66 provides the top surface portion of the conductor 54.

Art Unit: 2814

10. In re claim 8, Boeck et al. disclose a method as claimed in claim 7, characterized in that the capping layer 66 is comprised of a material selected from a group comprising titanium nitride, titanium tungsten and tantalum nitride.

11. In re claim 9, Boeck et al. disclose a method as claimed in claim 1, characterized in that the dielectric layer (58, 62) is applied by depositing a dielectric material having a dielectric constant lower than that of silicon oxide.

12. In re claim 10, Boeck et al. disclose a method as claimed in claim 9, characterized in that the dielectric layer (58, 62) is applied by depositing a material selected from a group comprising hydrogen silsesdioxane, parylene and a fluorinated polyimide.

13. In re claim 11, Boeck et al. disclose a method as claimed in claim 1, characterized in that the via 68 is filled by depositing a conductive layer 54, which conductive layer 54 comprises a metal selected from a group comprising aluminum, copper and tungsten.

### ***Response to Arguments***

14. Applicant's arguments with respect to claims 1 have been considered but are moot in view of the new ground(s) of rejection.

**Conclusion**

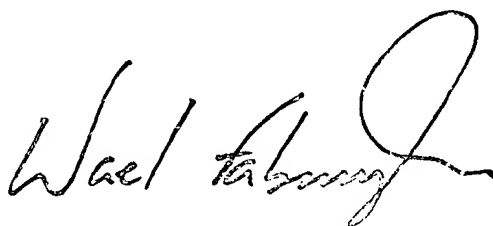
The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Nathan W. Ha whose telephone number is (703) 305-3507. The examiner can normally be reached on M-TH 8:00-7:00(EST).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wael Fahmy can be reached on (703) 308-4918. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 308-7722 for regular communications and 308-3432 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

Nathan Ha  
November 19, 2002

A handwritten signature in black ink, appearing to read 'Wael Fahmy', with a stylized, flowing script.

SUPERVISORY PRIMARY EXAMINER  
TECHNOLOGY CENTER 2000